If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match.
The on-screen version of the Collider-Accelerator Department Procedure is the Official Version.
Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.

C-A OPERATIONS PROCEDURE MANUAL

8.17.2 Trouble-Shooting Operating Motor Failures

Text Pages 2 through 5

ATTACHMENTS

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

R. Karol

8.17.2 Trouble-Shooting Operating Motor Failures

1. Purpose

This procedure is to be used when diagnosing motor trips due to overcurrent.

2. Responsibilities

Personnel who respond to motor overcurrent trips are responsible for following this procedure to ensure their safety, and to prevent worsening conditions caused by the overcurrent.

3. Prerequisites

3.1 Only personnel trained in this procedure and qualified to diagnose and test power equipment shall implement this procedure.

3.2 Review one line diagram of area, if available.

3.3 Personnel shall have passed Electrical Safety Course and LOTO.

3.4 Appropriate equipment including "Wiggins", ohmmeter, fuses, safety glasses, hard hat, and clamp-on ammeter.

4. Precautions

Warnings:

1) 480 volt and 208 volt power circuits can result in electrocution, burns, eye and/or ear damage, due to the large amounts of energy available from the power system.
2) Wear proper Personnel Protective Equipment (PPE), which shall include safety glasses and a hard hat.

5. Procedure

5.1 After indication of motor trip, electrically isolate the circuit by opening the appropriate isolation device.

Note:

Depending upon the circuit arrangement, the isolation device can be part of the starter, or it can be a separate circuit breaker or disconnect switch upstream of the starter. (See Attachment 8.1.)

5.2 Perform appropriate LOTO operation. Open switch cover and verify that all phases are open, and using a "Wiggins", verify that the voltage is off.

5.3 Check all fuses with ohmmeter to determine if they have opened.

5.4 Examine the switch for burns or other damage and any odors that would indicate arcing or burning. If device shows damage go to step 5.11.

5.5 If separate enclosure, open starter and check and note if the OC relays have operated.

5.5.1 Examine the starter for burns or other damage, and any odors that would indicate arcing or burning. If device shows damage go to step 5.11.

5.6 Examine the motor for burns or other damage and any odors that would indicate arcing or burning, and check motor shaft can turn (no binding). If motor shows damage go to step 5.11.

5.6.1 If possible, read/record nameplate date (running current, speed, HP).

5.7 Test of Insulation

5.7.1 At the starter, using an ohmmeter, test each cable to the motor to ground.

5.7.2 Test cable from load side of overcurrent relay to ground.

5.7.3 If low readings, disconnect motor from feed at motor terminal box and megger the motor.

Note:

1. If ohmmeter readings are above 100 Megohm or less than 1 Megohm use a 500V megger and re-test each lead to ground.
2. If reading > 1.5 Megohm on ohmmeter or megger, insulation can be assumed to be operational.
3. If not then go to step 5.11.

5.8 If one or more fuses have opened, replace ALL fuses.

5.8.1 Use same voltage rating and current rating and FRN types, etc.

5.8.2 If original interrupting rating is not known, contact Power Distribution Engineer.

5.9 If there is no obvious problem in the previous steps continue, otherwise go to step 5.11.

5.9.1 reset OC relays,

5.9.2 close and secure all covers to equipment,

5.9.3 Stand clear of motor terminal box and starter,

5.9.4 Close isolation device by standing to the side,

5.9.5 Use normal control switch to start motor.

5.10 If motor operates successfully:

5.10.1 Check current to motor with ammeter, or with clamp-on ammeter if possible, otherwise go to step 5.11.

5.10.2 Check driven equipment outputs - pump pressure/flow, air flow, etc.

5.10.3 Listen at equipment for any unusual noises.

Note:
If operation seems OK - check after a short period of time of operation to verify readings, noise, etc. If none, go to step 5.11.

5.11 Notify Power Distribution Group Leader of any problems and corrective actions taken. At the discretion of the Power Distribution Group Leader, reported problems will be documented and analyzed for possible trends.

Warning:
If ohmmeter readings < 1.0 megohm or megger readings < 1.5 megohm remove motor from service by LOTO the isolation device and CALL SPECIALIST and supply as much data as possible.

6. Documentation

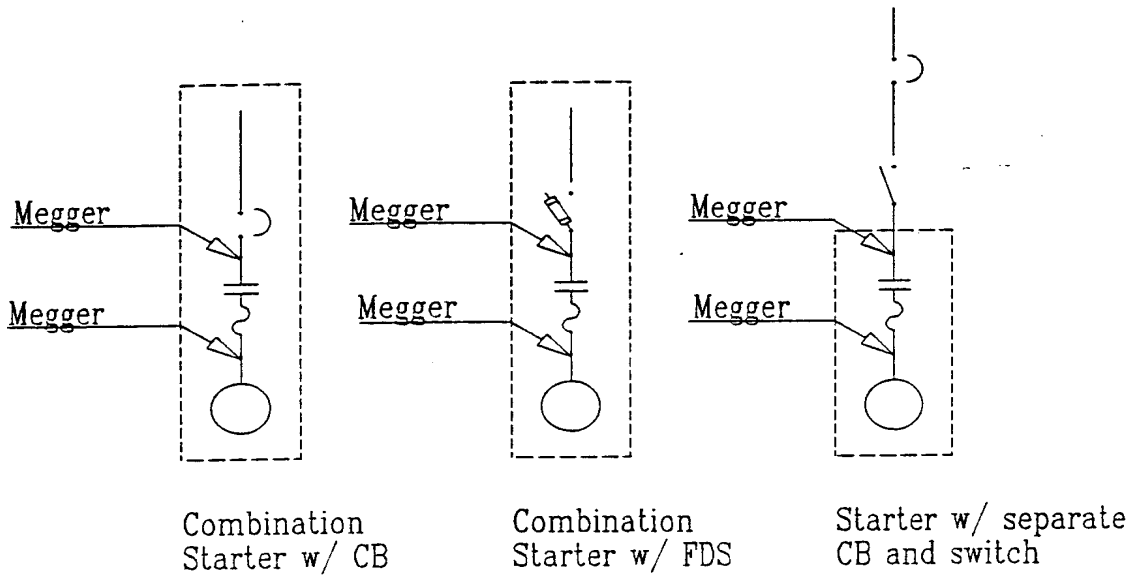
None

7. References

7.1 ES&H Standards 1.5.0, 1.5.1.

8. Attachments

8.1 Sample Motor Starter Configurations.



Sample Motor Starter Configurations